



UNITED NATIONS CONFERENCE
ON THE APPLICATION OF SCIENCE AND TECHNOLOGY
FOR THE BENEFIT OF THE LESS DEVELOPED AREAS

E/CONF.39/D/183

12 Nov.1962

ORIGINAL : ENGLISH

Agenda Item : D.1

United States of America

THE STRATEGY OF INDUSTRIAL DEVELOPMENT

By William A.W. KREBS,
Vice President,
Arthur D. Little, Inc.,
Cambridge, Massachusetts,
U.S.A.

Papers have been contributed to the United Nations Conference on the Application of Science and Technology for the Benefit of the Less Developed Areas as working papers for that Conference. They are published as presented by the contributors, and the contents and the views expressed are those of the contributors. (See notes overleaf.)

NOTES

1. Papers selected for inclusion in General Sessions will be available at the Conference in the following official languages of the United Nations: English, French, Russian and Spanish.

2. Papers selected for inclusion in Specialized Sessions will be available at the Conference in only one of the above official languages.

3. Summaries of all papers, as submitted by contributors, will be available at the Conference in the following official languages of the United Nations: English, French, Russian and Spanish.

4. Papers and summaries will not be available for general distribution in advance of the Conference. They will be published in advance in limited quantities only for the use of delegations of participating governments and of other authorized participants. Post-Conference publication and general distribution of the Conference Proceedings will follow United Nations practices as laid down by the United Nations Publications Board.

THE STRATEGY OF INDUSTRIAL DEVELOPMENT

by

William A. W. Krebs, Vice President
Arthur D. Little, Inc., Cambridge, Massachusetts, U. S. A.

INTRODUCTION

1. In the perspective of history the belief that man can remake his economic environment to the image that he desires is a new idea. That he can do so without sacrificing the political freedom of individual citizens is controversial. Combining these notions in a program of action is an act of faith and daring. The remarkable fact is that so many of the nations of the world have embarked on such an adventurous course in this generation.

2. The battle for economic development thus joined is fought on many fronts of which the industrial is only one and, in most nations at this stage of the battle, statistically the least significant. In this decade the greatest advance in per capita income in most of the developing nations will arise from increasing the productivity of agriculture. The symbolic importance of industry is so great, however, that progress in industry is a political necessity in the development battle, quite apart from the important role that the processing and supply industries play in supporting the growth of agriculture everywhere and the promise of rapid industrial advance on a broad front in certain countries.

3. Industrial development, in appropriate balance with other development effort, is thus indispensable, and a strategy especially designed for the industrial sector must be a part of each country's larger strategy of economic development. The design of such a strategy however must remain for many years to come more art than science. Industrial development programs in enterprise economies outside the continental United States or Western Europe are of recent origin, with the notable exception of Puerto Rico whose 20 years of intensive industrial development provide a rich store of experience. Facts about such programs are inadequately available; analysis of their meaning has scarcely begun. Twenty years from today, one may hope a social science of industrial development may have emerged. For the present, we must work with much less - but work we must.

4. Fortunately it is possible to distill from even such limited experience a body of principles which may be regarded as the elements of a strategy for industrial development having general applicability to the needs of the less-developed areas of the world. These elements may be classified as institutional, procedural and substantive.

INSTITUTIONAL ELEMENTS OF AN INDUSTRIAL DEVELOPMENT STRATEGY

5. The key institutional element in successful industrial development strategy is a central executive organization having high professional competence and political power. In some underdeveloped countries such an institution already exists; in others, its functions are present but are being exercised in a variety of political and economic organizations scattered through the governmental structure of the

private economy. Successful programming requires that these functions be centralized, placed in competent hands, and backed to the hilt with political power.

6. The mere establishment of such an institution - whether it is called an Industrial Development Corporation, an Industrial Development Center, or by some other name - has symbolic importance inside and outside its country. It demonstrates that the country is serious about industrial development. It shows that the acceleration of industrial development is recognized as something that is not expected to happen without major, concentrated effort, that it is seen as a key task which ministries which have their normal work to do cannot be expected to perform adequately, and something which a few key individuals, no matter how highly placed, cannot do without adequate budget, technical staff, and capacity to follow through.

7. The role of the industrial development organization is primarily to give leadership in mobilizing the resources of the country for industrial development. This means working closely with both government agencies and representatives of the private sector. It also means making full use of the increasingly wide range of resources available from outside the country from international agencies, from foreign governments, from foreign industries and investment organizations. Another major task is to act as the government's advisor on a wide variety of important policy questions affecting industrial development, including taxation, tariffs, labor laws, education and financial policy. The organization must monitor the economic climate from the point of view of industrial development to identify the barriers which are holding development back and to take action to see that something is done about them. Many such barriers can be broken but often only after months or years of study, of steady and intelligently applied pressure, and long campaigns. The organization should also be the center for information of interest to potential investors in industry, both foreign and local. This involves maintaining adequate statistics and library reference material and carrying on research to obtain information not readily available. Publication of basic information of interest to prospective investors is usually also necessary.

8. The conditions which are essential to the success of the key executive organization for industrial development include continuity of basic personnel and policy, strong leadership, highly qualified staff, full support of the key ministries, and the respect of the private sector. Continuity can often best be achieved by establishing such an organization at a position midway between government and the private economy, with a mixed government-private board or governing body. It can then better survive the changing tides of political fortune while remaining responsive to the changes of policy which must come with changes in government.

9. Strong leadership requires that the head of the organization be a person who commands the respect of the ministries of the government, of the bankers and industrialists, of foreign businessmen and government officials, and - in many countries - of labor leaders and the press. This is a large order in any country, but failure to meet it is likely to lead to failure of the program.

10. Backing such an individual with highly qualified staff is equally essential and perhaps even more difficult in view of the shortage of such persons in most developing economies. Fortunately, if the policies of the country will permit it, the use of expatriate specialists, either as individuals or through contract with the increasingly large number of foreign organizations - both public and private - which now operate in this field can fill the gap while nationals are being trained to execute the duties of staff.

11. Full support of the key ministries is important because industrial development depends so heavily on preconditions and services which are the responsibility of government almost everywhere in the world. For example, the design of highway systems can have a stimulating or stultifying effect on regional dispersion of

industry; decisions on tariff policy spell for many industrial projects the difference between survival or failure; labor laws vitally affect competitive position.

12. The same conditions which lead to continuity and strong leadership are likely to earn for the organization the other essential ingredient for its success the respect of the private sector of the economy, without which, in the mixed economy characteristic of so much of the developing world, little can be done. Winning the confidence of those with the private investment resources and managerial skills necessary for industrial development, like winning the confidence of the ministries, is an essential prerequisite for success of the executive organization in building strong industrial development programs.

13. Around or within the key executive organization for industrial development must be clustered a range of ancillary specialized institutions. Like the concept of the central organization itself, the ideas expressed in many of these have emerged only recently. As tools of industrial development, they are still experimental and evolving. They include development banks, technical assistance institutes, industrial development consulting centers, and managed industrial districts. Each of them has a unique contribution to make to a program of industrial development. If institutions of these kinds do not exist in a developing economy, one of the first tasks of the central industrial development organization is likely to be to create them or bring about their creation.

14. The development bank in one form or another, normally a quasi-governmental corporation charged with responsibility for mobilizing capital for economic development programs, is by now a common phenomenon in the developing economies. The number of such institutions around the world today numbers close to a hundred and more are appearing as new programs of development are launched. Historical studies have shown that such institutions in various forms, normally operating as private investment banks, have been an essential component of economic development in Western Europe and the United States since the beginning of the industrial revolution. The basic difference between a development bank and a commercial bank is that, while the latter engages in financing trade and commerce through loans usually limited to one year, a development bank provides medium and long term "soft" loans and, more importantly, invests in equity securities of new enterprises. This is normally the least easily available form of capital in a developing economy. Of almost equal importance in contributing to the success of new industrial projects is the practice of the better-run development banks of making careful technical and financial analyses of new ventures as well as rendering consulting assistance to management during early stages of operations. Fortunately, there are relatively plentiful sources of capital for development banks today from international institutions, from the foreign assistance programs of the industrialized countries, and from the governments of developing countries themselves.

15. A further contribution that a well-managed development bank can make is to stimulate the creation of a capital market for securities of industrial enterprises, thus channeling local capital away from relatively unproductive uses into the mainstream of industrial development. If such a bank also participates actively in cooperation with the central executive organization for industrial development in searching out and analysing the merits of investible industrial projects, it can effectively catalyze the growth of industry. In economies where this kind of institution is not present, or where its effectiveness has been limited for any of a variety of reasons, early attention to strengthening it is an element of industrial development strategy that will pay dividends.

16. The technical assistance institute is another specialized institution for the support of industrial development which may have to be created or enlarged to accelerate industrial growth. Such an organization ideally will provide at least the following services at a high level of skill and a low level of cost relative to value: management counsel, product and process development, market research,

technical trouble-shooting, and applied research and development. In at least a portion of its program such an institute must be in a position to maintain proprietary confidences of its industrial clientele. It follows that, although it must almost always be subsidized by government in its early stages, it must be so organized as to give it substantial independence of government at the earliest practicable date.

17. Somewhat like the technical assistance institute, and overlapping it in function in the management field, is the industrial development consulting center. Of particular value in those economies with a thin layer of trained business management or with poorly developed small and medium scale enterprises, this institution - of which increasing numbers of prototypes have recently been appearing - concentrates its services on the business management problems of industrial enterprise, and extends in effect a subsidized management consulting service. In some forms this service has been coupled with provision of a wide range of training programs, both at the headquarters of the institution and on the job, and with an information service designed to bring to the attention of industrial managers the most useful and current knowledge of their professional field and the industry within which they function.

18. The planned and managed industrial district represents still another institutional device called into being by the special needs of industrial development programs. Experience with the industrial district - variously called industrial estate and industrial park - goes back to the 19th century in both the United Kingdom and the United States, in both of which it has been spectacularly successful. More recently Puerto Rico and India have experimented in the field with good results. Fundamentally, an industrial district is an area prepared with sites, roads, utilities, a communication network, service facilities, and in some cases shell buildings or even completed simple factories, ready for occupancy, with internally consistent legal and management arrangements specialized to meet the needs of industrial tenants or cooperative owners. Prearranged financing for equipment or even working capital is sometimes provided, together with advisory services, assistance in meshing into the community, and other amenities designed to ease the entrance onto the scene of foreign or new indigenous industrial enterprises. Economies of scale in planning and construction and the immense value of "readiness" are the significant advantages offered by this approach to expanding enterprise. Recently, the planned industrial district has been experimentally used in an effort to make national policies for decentralization and regionalization of industrial development more effective.

19. Another group of ancillary institutions must be of concern to the central executive organization responsible for industrial development - those necessary in the creation of the intellectual infrastructure of an industrial society: the vocational training schools, the centers for management education, and the universities which supply the leaders of the service professions of law, accounting and finance. Obviously the techniques for stimulating activity in this quarter must be more subtle, more indirect, and in some ways more imaginative than those applicable to other parts of the institutional problem. In the long term, however, the quality of these independent institutions will govern the quality of the development program. In many developing countries the pattern of education has been classical or oriented to the supply of civil servants rather than industrialists, engineers and businessmen. Redressing this imbalance, consistent with the limitations of the culture and the economy, requires long and costly effort, but it must be made. One technique which has proved effective is fostering linkages between indigenous centers of learning and foreign institutions prominent in technology, management education, and vocational training. In some countries, ambitious experiments are under way which include the creation of new institutions of learning which emphasize these aspects of education, sponsored by foreign institutions and sharing their faculties during the early years.

20. Each of the ancillary institutions described must be designed for the special circumstances of each national or regional setting into which it is to be fitted. Fortunately, however, experience with all of them is accumulating and in recent years the literature of experience is becoming more widely available. A successful strategy for industrial development will draw heavily on such experience while adapting it flexibly to local requirement.

PROCEDURAL ELEMENTS OF AN INDUSTRIAL DEVELOPMENT STRATEGY

21. So far as experience may be relied upon as a guide, it suggests the importance of four procedural elements in a successful industrial development strategy:

- (a) Early formulation and use of quantitative objectives.
- (b) Adherence to a system of priorities for development.
- (c) Reliance on sound economic research to illuminate decisions of policy.
- (d) Energetic promotion of investment.

22. That finite goals are important means for mobilizing effort is a fact of human nature. An industrial development program requires a timetable and quantitative objectives. In the most successful programs these have been expressed in the number of industrial jobs to be added to the economy in some fixed period of time, in units of production of key commodities, in numbers of industrial establishments to be created, and in monetary wages. Experience suggests that the danger is greater of setting too modest a target than of unrealistically reaching beyond reasonable capacity. The most successful programs of industrialization have been dramatized in terms which caught the imagination and awakened the enthusiasm of the whole community and, often by contagion, of industrialists and investors in foreign countries.

23. Since industrial development is most effective when carried out in the context of a broad and comprehensive economic development plan for all sectors, sound strategy requires consistency between industrial plans and those for the other parts of the economy. The recent emphasis on intermediate-range national economic planning for development in many countries is a welcome phenomenon and permits industrial development to be both more orderly and more realistic. Critics of planning who express concern that it leads to destruction of private initiative in economic affairs miss the point. On the contrary, a well-defined set of objectives and realistic procedures for moving toward them is evocative of the best efforts of the entrepreneur, as experience in Puerto Rico - certainly an enterprise economy - testifies.

24. Of nearly equal importance to quantitative objectives is adherence to a system of priorities in making the key decisions. Everything cannot be done at once with limited resources. An explicit framework of priorities for development, honestly constructed and consistently adhered to, will take the heat out of difficult decisions which will otherwise be made on grounds of political expediency, thoughtless enthusiasm or other unsound bases.

25. Both objectives and priorities can only arise - if they are to be sound - out of careful and conscientious economic and sometimes technical research. The time and money spent in obtaining a clear and complete view of the circumstances within which the development program is to proceed is the least costly investment that can be made even though it may require hundreds of thousands of dollars and months of painstaking effort. Nor is research something to be done once and filed away. The pace and complexity of change mean that every decision must be regarded as open to revision in the light of changed circumstances, so that a strong economic research staff must be continuously addressing itself to the production of new information and insights into the continuing process.

26. In danger of being overlooked but critically important for success is the use of investment promotion in industrial development. Fundamentally, promotion of

investment is required because of the imperfect knowledge about opportunity and risk which exists in even the most sophisticated investment community. In the case of a developing economy the imperfections are enormously greater. Promotion is the communications function which connects investor with opportunity and gives him the knowledge and the confidence to risk capital in industrial development. For most developing economies promotion of investment from abroad is the most critical task. Foreign investors usually have little knowledge of the developing country, its laws and its people. Accordingly they lack confidence in their ability to enter successfully, even if their attention has been attracted by general favorable publicity. A system must therefore be devised to overcome this lack of confidence and lead the desirable prospective investor virtually by the hand through the stages of early investigation to decision-making and later through startup and early stages of operations. The most highly successful investment promotion programs, like the most highly successful industrial development programs (and they have to date been largely the same ones), have been both massive and highly personalized, with great emphasis on research and the communication of accurate factual data to carefully selected prospects. A failure to budget adequate funds or plan sufficient effort for the promotional phases of development can waste all the other expensive gains of a fine industrial development program.

SUBSTANTIVE ELEMENTS OF AN INDUSTRIAL DEVELOPMENT STRATEGY

27. The substantive elements of an industrial development strategy are the most diverse, specialized to each situation and controversial. Even here, however, experience has begun to yield lessons which validate principles of general applicability.

The Importance of Market Analysis

28. It is likely that more waste has been caused in industrial development programs from decisions made with inadequate knowledge of the market for production than from any other single cause. This is a particularly common phenomenon where a substantial portion of the capital for the project comes from public agencies or from a large number of private investors no one of whom has actual experience in the operation of the particular industry. On the other hand, a careful examination of present and potential markets for the products of industry, and the selection of projects on this basis, can be the touchstone of success. Like so many other aspects of management "science", market research has developed methodology and principles which can best be applied by experienced professionals. At the same time, no specialist in marketing can possibly be sufficiently familiar with all sectors of industry and factors affecting markets for a wide range of products. Thus a successful program of market research requires both the marketing expert and the industry specialist. The selection for emphasis in an industrial development program of those industrial sectors in which market analysis indicates opportunity, not only for the present but through the foreseeable future, can be a key substantive element for success.

A Policy of Integrated Development

29. The extent to which the selection of industrial projects to be emphasized in a development program can be guided through analysis of the degree to which they mutually support and stimulate one another is a controversial matter. It is clear, at least, that industrial projects can be linked to one another in the sense that one provides the raw material or the market for the other. There is a growing body of theory which suggests that certain types of industry tend to induce or stimulate complementary industrial activity to a higher degree than others. Thus the much-maligned iron and steel industry is seen as having a high degree of interdependence with other sectors both in terms of purchases from them and sales to them while such activities as fishing, transport, services and trade have relatively low interdependence characteristics and therefore presumably low priority

in development programs, at least for that reason. Of course, the importance of such an activity as fishing for supply of protein in low-protein diets represents the kind of qualification for such a priority selection that illustrates its basic complexity. To the extent that analysis can carry the load, however, it appears important that attention be paid in formulating development strategy to the stimulus-creating aspects of new projects or, in other terms, how well they will "mesh into" the growing economy.

Application of the Test of National Benefit

30. The analysis of an industrial project to test the costs it will place upon the economy as well as the benefits it can be expected to produce is an essential but sometimes neglected step of industrial development programming. While in many cases an industrial project which is sufficiently promising to attract investment capital will without question represent a net gain to the national economy, there are also situations in which there may be a great difference between the value of a project to its private owners and its value to the economy as a whole. For example, because a project may use labor which is unemployed otherwise, it may be more valuable to the national economy than a simple tabulation of the wages to be paid, for purposes of private analysis of the soundness of the investment, would show. Similarly a project using natural resources which would otherwise be wasted, such as forest products, may have a greater value to the economy than to the private company which must pay for the resources at regular prices. A project which can make a valuable contribution through training labor or in providing services or goods needed by other new industries, thus serving as a stepping stone in the process of industrialization, may have a surplus of value to the economy that will not show up in the entrepreneur's calculation of commercial profitability.

31. The converse may also be true. A project to substitute local production for imports may be commercially profitable only because, through tariff protection, it can sell its product to the local market at protected higher prices. The difference between the protected price and the price at which the competitive import would be available represents a cost to the economy which should be made explicit by analysis.

32. To show such national costs and benefits separately from commercial profitability is not to answer the questions of policy to which they are related, such as "How much tariff protection is justified?" But to fail to break them out for consideration is to run the risk of making decisions which will later prove to have been faulty for failure to recognize and consider all of their consequences.

Application of the Test of Commercial Viability

33. Strange as it may seem, industrial projects sometimes receive the benefits of national subsidy, tax concessions, and even investment of public funds when careful analysis would have shown that, for technical or commercial reasons, they can never be financially successful. There are many interested parties whose return from the initiation of a project will be secured before the early years of operation have passed and whose support of the project is given without concern for its long-term success. Protecting the program from the influence of such special interests can be achieved only through painstaking analysis of the commercial feasibility of each significant industrial project at a high level of competence. One way of securing such analysis is by arranging for the participation of substantial industrial or banking interests under terms that will make certain that the investment is not fully paid out until commercial viability has been demonstrated. Another is to provide the technically qualified staff directly or through securing competent independent advisors. Regardless of method, the function is an indispensable substantive element of successful industrial development strategy.

Creative Use of Technology

34. It is hard to imagine a successful industrial development program which does not make use of a wide range of technical analysis. Even in the preliminary screening of an economy for identification of sectors of industrial opportunity, the insights of an experienced team of industrial specialists, trained in the engineering and management sciences, can enrich and illuminate the judgments of administrators, economists and managers. The possibilities for adaptation of processes practiced in the earlier stages of the more advanced economies for application under current and usually more limiting requirements of scale and complexity in a developing economy can best be analyzed by the experienced technologist. Furthermore, the wide range of industrial operations and processes to be analyzed in the course of project feasibility studies demands the availability of a similarly wide range of technically qualified industrial specialists. Fortunately, conditions of transportation and communication in today's world make available such services from the resources of the more highly industrialized economies through a variety of institutions and firms. Wise use of such resources is another key to a successful industrial development program.

Respect for the Capacity of Research and Recognition of Its Limitations

35. Most successful industrial development programs put great reliance on both economic and technical research to illuminate problems which must be resolved by the decision maker. Experienced managers and administrators, whether in industry or government, know the value of a cold shower of facts in a heated controversy over plant location, level of subsidy, competition among suppliers, or project selection. The countervailing principle - that all technical analysis falls short of the subtle but overwhelmingly important intangibles of politics, human relations, taste, and "hunch" - is of at least equal importance and perhaps in more danger of being overlooked in the increasingly professionalized field of industrial development. A nice balance is of the essence of success.

A Climate for Enterprise

36. Finally, an industrial development strategy for an enterprise economy will most certainly fail unless it provides the preconditions which evoke enterprise: civil order and good government, reasonable economic stability, laws which encourage risk-taking, and a physical infrastructure - transportation and utilities capable of supporting an industrial effort. More subtle, but more far-reaching and fundamental than any of these, is the creation and sustenance of an attitude in society which sees in the man of enterprise a symbol of what the society values. To the extent that this occurs, all other measures will be facilitated.

* * * * *

37. To catalogue the institutional, the procedural and the substantive elements which comprise a successful industrial development strategy is not equivalent to designing it. Designing a strategy is not equivalent to executing it. As in all human affairs, the link in the chain of circumstance supplied by the administrator is indispensable if desire is to culminate in achievement. Nonetheless sound theory maximizes potential and minimizes risk. It can be disregarded only at peril.

...the ... of ...
...the ... of ...
...the ... of ...
...the ... of ...
...the ... of ...
...the ... of ...
...the ... of ...
...the ... of ...
...the ... of ...
...the ... of ...

...the ... of ...
...the ... of ...
...the ... of ...
...the ... of ...
...the ... of ...
...the ... of ...
...the ... of ...
...the ... of ...
...the ... of ...
...the ... of ...

...the ... of ...
...the ... of ...
...the ... of ...
...the ... of ...
...the ... of ...
...the ... of ...
...the ... of ...
...the ... of ...
...the ... of ...
...the ... of ...